

REMARKS

Applicant respectfully requests consideration of the subject application as amended herein. This Amendment is submitted in response to Office Action mailed March 28, 2006. Claims 1-32 are rejected.

In this Amendment, Claims 1, 5, 7, 18, and 28 have been amended to put the claims into condition for allowance. Claims 6 and 21 have been cancelled. Applicant submits that the Amendment did not add new matter that require new search and eagerly seeks entering of the Amendment.

Rejections under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-5, 18-20 and 28 under 35 U.S.C. §103(a) as being unpatentable over U.S. 6,715,943, (Nagamine) in view of U.S 6,210,481 (Sakai). The Examiner has also rejected claims 6-17, 21-27 and 29-32 under 35 U.S.C. §103(a) as being unpatentable over Nagamine in view of Sakai as applied to claims 1, 18 and 28 above and further in view of JP2001-205162A (JP'162).

Applicant respectfully disagrees. Applicant submits that Nagamine, Sakai, and JP'162 individually or in combination do not teach, suggest, or motivate the solvent bath that Applicant claims. Exemplary claim 1 claims:

1. A semiconductor substrate processing apparatus, comprising:
a frame;
a substrate support mounted to the frame to support a semiconductor substrate;
a dispense head, having at least one outlet opening, connected to the frame for movement relative to the semiconductor substrate; and
a solvent bath attached to the frame having a reservoir and a drain, the reservoir holding a first fluid, the solvent bath shaped such that when the dispense head is in a selected position in the solvent bath, a second fluid dispensed from the at least one outlet opening enters the drain without mixing

with the first fluid in the reservoir, while the at least one outlet opening is exposed to air saturated with vapor of the first fluid in the reservoir,

wherein the solvent bath includes a recess for the dispense head to engage the solvent bath such that a fit of the dispense head into the recess substantially seals the solvent bath such that only a minimal amount of the saturated air escapes therethrough.

As the Examiner stated, Nagamine does not disclose a solvent bath with a drain. It is Applicant's understanding that Nagamine discloses an apparatus with a washing tank containing a washing fluid for storing a developing solution supply nozzle while on stand-by, and a separate area for discharging or purging the developing solution supply nozzle. It is Applicant's understanding that while on stand-by, the nozzle is soaked in the washing fluid held in the washing tank. Specifically, Nagamine discloses:

Next, the developing solution supply nozzle 90 which is kept on stand-by in the washing tank 98 is moved from the washing tank 98 to a position above the collecting plate 84 between the washing tank 98 and the cup side portion 76. In this position, the developing solution supply nozzle 90 starts to discharge the developing solution and continues to discharge for testing until a stable discharge condition is obtained.

(Col. 10, lines 56-63). Thus, Nagamine not only does not disclose a drain, Nagamine also does not disclose a dispense head that dispenses a second fluid without mixing with a first fluid while positioned in a solvent bath. Rather, Nagamine discloses an apparatus where the developing solution supply nozzle is stored in a position separate from where it is discharged. Additionally, Nagamine does not disclose that the at least one outlet opening of the dispense head is exposed to air saturated with vapor of the first fluid in the reservoir.

It is Applicant's understanding that Sakai discloses a nozzle cleaning apparatus including a drain and shower nozzles that spray a developing nozzle tip with a cleaning solution and/or with nitrogen gas. Specifically, Sakai discloses:

When the liquid output portion 41a of the developing nozzle 41 is inserted into the bath chamber 52, a cleaning solution (pure water) is sprayed onto

the liquid output portion 41a from the shower nozzles 57a, 57b. In this way, the attached developing solution is removed from the liquid output portion 41a of the developing nozzle 41 and thus the liquid output portion 41a is cleaned. The drainage solution flows along the drain groove 53 and discharged by way of the drain pipe 54. Note that the cleaning solution is sprayed from the nozzles 57a, 57b at the same time, the developing solution may be output from the developing nozzle 41. Subsequently, N2 gas is sprayed onto the liquid output portion 41a from the shower nozzles 57a, 57b to blow away the liquid drops from the liquid output portion 41a.

(Col. 7, lines 26-39).

The Examiner argues that it would have been obvious to combine the reservoir in Nagamine with the drain of Sakai, whereby the “second fluid dispensed from the at least one outlet opening enters the drain and the at least one outlet opening is exposed to the first fluid in Nagamine to replace the soaking fluid in the reservoir as much as needed preventing contamination of the dispensing head.” However, Applicant respectfully points out that frequent replacement of the first fluid in order to prevent mixing of the two fluids is contrary to the utility of Applicant’s invention. Applicant teaches that one problem with the prior art is that “the photoresist and solvent are very expensive and having to waste photoresist and replace the solvent so often greatly increase the cost of semiconductor wafer processing.” [Paragraph 005] Accordingly, Applicant teaches and claims an apparatus where a dispense head may dispense a second liquid “without mixing with the first fluid in the reservoir,” such that the first fluid does not need to be replenished as a result of the dispensing.

Contrary to the combination suggested by the Examiner, Applicant claims an apparatus wherein the first fluid in the reservoir is present while the dispense head dispenses a second fluid. Thus, draining and replacing a soaking fluid in the reservoir as much as needed in order to prevent contamination of the dispensing head does not meet the element that the first fluid in a reservoir be present at the same time the dispense head dispenses a second fluid.

Additionally, neither Nagamine nor Sakai disclose an outlet opening exposed to air saturated with vapor at the same time the dispense head dispenses a fluid. In fact, neither Nagamine nor Sakai mention exposure to air saturated with vapor. Therefore, Applicant respectfully submits that combining Nagamine and Sakai would have not provided the elements of claims 1-5, 18-20 and 28 as amended.

The Examiner has also rejected claims 6-17, 21-27 and 29-32 under 35 U.S.C. §103(a) as being unpatentable over Nagamine in view of Sakai as applied to claims 1, 18 and 28 above and further in view of JP2001-205162A (JP'162). It is Applicant's understanding that JP'162 discloses a nozzle cleaning apparatus including a drain and shower nozzles used to spray a developing nozzle tip with a cleaning solution and/or with nitrogen gas, and in addition also includes a liquid that when evaporated provides an "[a]tmosphere for cleaning." (see Basic-Abstract Novelty translation).

The Examiner argues that it would have been obvious to combine the reservoir in Nagamine with the drain in Sakai and the "cleaning atmosphere by evaporating cleaning liquid from the reservoir" in JP'162. However, Applicant respectfully submits that Nagamine, Sakai, and JP'162 individually or in combination do not teach, suggest, or motivate an apparatus where "the dispense head is in a selected position in the solvent bath, a second fluid dispensed from the at least one outlet opening enters the drain without mixing with the first fluid in the reservoir, while the at least one outlet opening is exposed to air saturated with vapor of the first fluid in the reservoir."

It is to be appreciated that Applicant claims an apparatus wherein a dispense head may dispense a second fluid without mixing with a first fluid in a reservoir, and that at the

same time at least one outlet opening of the dispense head is exposed to air which is saturated with vapor of the first fluid.

Conversely, referring to JP'162 Fig. 4A – 4G, it is Applicant's understanding that the apparatus disclosed by JP'162 would not avoid the mixing of the second fluid (dispensed by the developing nozzle) and the first liquid in the reservoir. In order to avoid intermixing, the reservoir in JP'162 would require to be emptied prior to dispensing the second fluid from the developing nozzle. As discussed above, Applicant's claims require the reservoir may not be emptied prior to dispensing the second fluid, because the first fluid must be present at the same time. Thus, to combine Nagamine and Sakai with JP'162, as the Examiner has suggested, does not meet the element that the first fluid in a reservoir be present at the same time the dispense head dispenses a second fluid.

In addition, it is Applicant's understanding that combining the three references would also remove the evaporated "cleaning atmosphere" because the liquid would be removed from the reservoir, thus removing the source for the "cleaning atmosphere." See Fig. 4A – 4F, the liquid is removed from the apparatus during cleaning steps 4D – 4F. Thus, the combination of Nagamine, Sakai, and JP'162 does not disclose an apparatus wherein the dispense head may dispense a second fluid without mixing with a first fluid, and that at the same time at least one outlet opening of the dispense head is exposed to air which is saturated with vapor of the first fluid.

Therefore, Applicant respectfully submits that combining Sakai and JP2001-205162A to Nagamine would not have provided the elements of claims 6-17, 21-27 and 29-32 as amended.

CONCLUSION

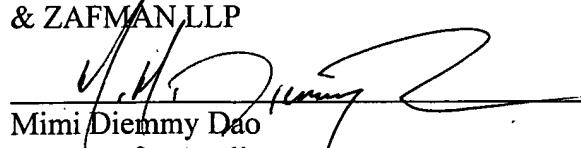
Applicants respectfully submit that in view of the amendments and arguments set forth herein, the rejections herein have been overcome. Accordingly, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner determines the prompt allowance of these claims could be facilitated by a telephone conference, the Examiner is invited to contact Mimi Dao at (408) 720-8300.

Pursuant to 37 C.F.R. 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

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Dated: June 19, 2006


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